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INTERNATIONAL CONTROL OF ATOMIC ENERGY

By J. Robert Oppenheimer

One day in a clearing in the forest, Confucius came upon a woman in deep mourning, wracked by sorrow. He learned that her son had just been eaten by a tiger; and he attempted to console her, to make clear how unavailing her tears would be, to restore her composure. But when he left, he had barely reentered the forest, when the renewed sounds of weeping recalled him. "That is not all," the woman said. "You see, my husband was eaten here a year ago by this same tiger." Again Confucius attempted to console her and again he left only to hear renewed weeping. "Is that not all?" "Oh, no," she said. "The year before that my father too was eaten by the tiger." Confucius thought for a moment, and then said: "This would not seem to be a very salutary neighborhood. Why don't you leave it?" The woman wrung her hands. "I know," she said, "I know; but, you see, the government is so excellent."

THIS wry tale comes to mind often when one observes the efforts which the Government of the United States is making to turn the development of atomic energy to good ends, and the frustrations and sorrows of the negotiations within the United Nations Atomic Energy Commission to which these efforts toward international control have now been reduced.

In these notes I should like to write briefly of some of the sources of United States policy, and of the formulation of that policy in the context of the contemporary world. Against the background of present prospects, which manifestly make success in any short term seem rather unlikely, to write of these matters today must of necessity be difficult. We are beyond advocacy, and not yet far enough for history. Yet the effort may not be without some slight usefulness in helping us to achieve an appreciation of what was sound, what was timely and what was lasting in the policy adopted by the United States, and even more than that, in helping us to see why this policy has not been successful. To answer simply that we have failed because of non-coöperation on the part of the Soviet Government is certainly to give a most essential part of a true answer. Yet we must ask ourselves why in a matter so overwhelmingly important to our in-

terest we have not been successful; and we must be prepared to try to understand what lessons this has for our future conduct.

Clearly, such understanding must depend in the first instance on insight into the nature and sources of Soviet policy, and indeed into our own political processes. Such an analysis, which in any final sense may transcend the collective wisdom of our time, is of course wholly beyond the scope of this paper. These notes are concerned solely with questions of our intent with regard to atomic control, questions which, though necessarily over-abstract, are yet a part of history.

II

The development of atomic energy had none of the other-worldliness normally characteristic of new developments in science. It was marked from the very first by an extreme self-consciousness on the part of all participants, which has given it an often heroic, though not infrequently rather comic, aspect. Thus when the phenomenon of fission was discovered by Hahn, after less than a decade of intensive exploration of nuclear structure and nuclear transmutations, we were all very quick to hail it, not as a beautiful discovery, but as a likely source of a great technological development. Long before it was known that conditions could be realized for maintaining a fission chain reaction, long before the difficulties in that enterprise were appreciated or methods for their solution sketched out, the phenomenon of fission was greeted as a possible source of atomic explosives, and their development was urged upon many governments. Thus, it happened that when, in the United States, the Manhattan District was approaching the completion of its task, and atomic weapons were in fact almost ready for use, there was a fairly well-informed group of people who in a sort of fraternal privacy had discussed what these developments might mean — what problems they would raise, and along what lines the solution might be sought. After the use of the weapons at the end of the war, much of this thinking became public; it achieved a sort of synoptic codification because of the joint requirements of easy comprehension and military security.

Yet it should be not without usefulness now to recall how the problem appeared to us in the summer of 1945, when it became fully apparent that atomic weapons and the large-scale release of atomic energy were not only realizable, but were about to be

realized. Even at that time a good deal of thought had gone into what subsequently came to be known as the peaceful use of atomic energy. On the technical side this preoccupation was natural enough, since many interesting avenues of exploration had been sealed off by the overriding requirements of the military program, and we were naturally curious to sketch out what might lie along these avenues against that time when there should be leisure for their pursuit.

But beyond that there was a political consideration. It was clear to us that the forms and methods by which mankind might in the future hope to protect itself against the dangers of unlimited atomic warfare would be decisively influenced just by the answer to the question "Is there any good in the atom?" From the first, it has been clear that the answer to this question would have a certain subtlety. The answer would be "yes," and emphatically "yes," but it would be a "yes" unconvincing, conditional and temporizing compared to the categorical affirmative of the atomic bomb itself. In particular, the advantages which could come from the exploitation of atomic energy do not appear to be of such a character that they are likely to contribute in a *very short term* to the economic or technical well-being of mankind. They are among the long-range goods. Thus they could not be expected to recommend themselves as urgent to the peoples of countries devastated by war, suffering from hunger, poverty, homelessness and the awful confusion of a shattered civilization. The importance of these limitations was perhaps not adequately recognized as a deterrent to the sort of interest in the development of atomic energy on the part of other peoples and other governments which might have played so great a part in assuring their support for our hopes. Only among the professional scientists, for whom the interest in the *development* of atomic energy is rather immediate, could we have expected to find, and did we in fact find, an enlightened enthusiasm for coöperation in this development.

Only two classes of peaceful applications of atomic energy were then apparent. To the best of my knowledge, only two are apparent today. One is the development of a new source of power; the other is a family of new instruments of research, investigation, technology and therapy.

Of the former, it was clear two years ago, and it is clear today, that although the generation of useful power from atomic sources

would assuredly be a soluble problem and would under favorable circumstances make decisive progress within a decade, the question of the usefulness of this power, the scale on which it could be made available, and the costs and general economic values, would take a long time to answer. As we all know, the answers depend on the raw material situation — essentially, that is, on the availability and cost of natural uranium and thorium — and on the extent to which one could in practice manage to consume the abundant isotope of uranium and thorium as nuclear fuels. Thus, no honest evaluation of the prospects of power in 1945 could fail to recognize the necessity of intensive development and exploration. Equally, no honest evaluation could give assurances as to the ultimate outcome beyond those general assurances which the history of our technology justifies. Certainly no evaluation at that time, nor for that matter today, could justify regarding atomic power as an immediate economic aid to a devastated and fuel-hungry world, nor give its development the urgency which the control of atomic armaments would be sure to have once the nature and ferocity of the weapons had been made clear to all.

With regard to the use of tracer materials, of radioactive species, and of radiations for science, the practical arts, for technology and medicine, we were in a better position to judge what might come. The use of tracer materials was not new. The last decade — the 1930's — had seen increasingly varied and effective applications of them. The use of radiation for the study of the properties of matter, for diagnosis and for therapy was likewise not new. Several decades of hopeful and bitter experiences gave us some notion of the power and limitations of these tools. What was held in store by the development of atomic reactors and of new methods for the handling of radioactive materials and the separation of isotopes, was a much greater variety and a vastly greater quantity of tracer materials, and a far higher intensity of radiation than had been available in the past. That this would be a stimulus to physical and biological study was clear; that its value would in the first instance depend on the skilful development of chemical, physical and biological techniques, and that this development even under the best circumstances would be a gradual and continuing one, we knew as well.

Thus, our picture of the peaceful uses of atomic energy was neither trivial nor heroic: on the one hand, many years, perhaps many decades, of development — largely engineering develop-

ment — with the purpose of providing new sources of power; on the other hand, a new arsenal of instruments for the exploration of the physical and biological world, and in time, for their further control, to be added to the always growing arsenal of what scientists and engineers have had available.

Three other matters were clear at that time. On the one hand, the development of atomic power could not be separated from technological development essential for and largely sufficient for the manufacture of atomic weapons. On the other hand, neither the development of power nor the effective and widespread use of the new tools of research and technology could prosper fully without a very considerable openness and candor with regard to the technical realities — an openness and candor difficult to reconcile with the traditional requirements of military security about the development of weapons of war. To these general considerations we should add again: although the peaceful use of atomic energy might well challenge the interests of technical people, and appear as an inspiration to statesmen concerned with the welfare of mankind, it could not make a direct appeal to the weary, hungry, almost desperate peoples of a war-ravaged world. Such an appeal, if made, could hardly be made in honesty.

III

Important though these views as to the peaceful future of atomic energy may have been, they were overshadowed then as they have been overshadowed since by a preoccupation of quite another sort. In an over-simplified statement, this is the preoccupation for the “control of atomic energy to the extent necessary to prevent its use for destructive purposes.” Two sorts of considerations bear on this problem, one deriving from the nature of atomic armament, and the other from the political climate of the postwar world. The former set of arguments has perhaps been given more relative weight in public discussions. Surely it is in the latter that the essential wellsprings of policy should have lain.

Even the weapons tested in New Mexico and used against Hiroshima and Nagasaki served to demonstrate that with the release of atomic energy quite revolutionary changes had occurred in the techniques of warfare. It was quite clear that with nations committed to atomic armament, weapons even more terrifying, and perhaps vastly more terrifying, than those already delivered would be developed; and it was clear even from a casual estimate

of costs that nations so committed to atomic armament could accumulate these weapons in truly terrifying numbers.

As the war ended, adequate defenses against the delivery of atomic weapons almost certainly did not exist. There would be variations, as military developments progressed, in the advantages of offense and defense. If effective anti-aircraft interception is developed before new types of aircraft or rockets, there may even be periods during which the delivery of atomic weapons is seriously handicapped. But it was clear then that for the most part the development of these weapons had given to strategic bombardment — that form of warfare which peculiarly characterized the last war, and contributed so much to the desolation of Europe and Asia — a new and important and *qualitative* increase in ferocity. It was not necessary to envisage novel and ingenious methods of delivery, such as the suitcase and the tramp steamer, to make this point clear to us. To this must be added a preoccupation not unnatural for us in the United States. It seemed unreasonable to suppose that any future major conflict would leave this country as relatively unharmed as had the last two wars and as totally unscathed by strategic bombardment. These points have been so commonly made, and with such fervor, that they have perhaps obscured to some extent the true nature of the issues involved in the international control of atomic energy.

In this last war, the fabric of civilized life has been worn so thin in Europe that there is the gravest danger that it will not hold. Twice in a generation, the efforts and the moral energies of a large part of mankind have been devoted to the fighting of wars. If the atomic bomb was to have meaning in the contemporary world, it would have to be in showing that not modern man, not navies, not ground forces, but war itself was obsolete. The question of the future of atomic energy thus appeared in one main constructive context: "What can be done with this development to make it an instrument for the preservation of peace and for bringing about those altered relations between the sovereign nations on the basis of which there is some reason to hope that peace can be preserved?"

Although this may have been the question in principle, a far more concrete and immediate problem faced the world. It is true that there may be a certain myopia in too great a preoccupation with relations between the Soviet Union and the United States. It is true that other sources of conflict, other possibilities of war,

and other problems which must be solved if the world is to achieve peace can well be discerned and could well be decisive. But although the coöperation — on a scale, with an intimacy and effectiveness heretofore unknown — between the Soviet Union and the United States may not be sufficient for the establishment of peace, it clearly was necessary. Thus, the question naturally presented itself whether the coöperative control and development of atomic energy might not play a unique and decisive part in the program of establishing such coöperation. Clearly, quite widely divergent views might be held as to the readiness of the Soviet Union to embark on such coöperation — varying from the belief that it would be forthcoming if the United States indicated the desire for it to the conviction that it was not in our power to bring it about. The prevalent view, and, I believe, that on which our subsequent policy was based, was that such coöperation would represent a reversal of past Soviet policy, and to some extent a repudiation of elements of Soviet political theory, very much more incisive in fact than the corresponding attitudes on our part. The prevalent view, that is, saw in the problems of atomic energy, not an opportunity to allow the leaders of the Soviet state to carry out a policy of international coöperation, of openness, candor and renunciation of violence to which they were already committed; rather, it saw an opportunity to cause a decisive change in the whole trend of Soviet policy, without which the prospects of an assured peace were indeed rather gloomy, and which might well be, if accomplished, the turning point in the pattern of international relations.

Why did the field of atomic energy appear hopeful for this endeavor? It appeared hopeful only in part because of the terrifying nature of atomic warfare, which to all peoples and some governments would provide a strong incentive to adapt themselves to a changing technology. As such, atomic weapons were only a sort of consummation of the total character of warfare as waged in this last world war, a sort of final argument, if one were needed, a straw to break the camel's back. But there were other points far more specific. The control of atomic weapons always appeared possible only on the basis of an intensive and working collaboration between peoples of many nationalities, on the creation (at least in this area) of supra-national patterns of communication, of work and of development. The development of atomic energy lay in an area peculiarly suited to such internationalization, and in

fact requiring it for the most effective exploitation, almost on technical grounds alone. The development of atomic energy lay in a field international by tradition and untouched by preëxisting national patterns of control. Thus the problem as it appeared in the summer of 1945 was to use our understanding of atomic energy, and the developments that we had carried out, with their implied hope and implied threat, to see whether in this area international barriers might not be broken down and patterns of candor and coöperation established which would make the peace of the world.

It was impossible even at that time not to raise two questions of some gravity. One was whether Soviet policy had not already congealed into almost total non-coöperation. The difficulties during the war years, both in coöperation on technical problems which had some analogy to atomic energy, and in the more general matters of the coördination of strategy, could certainly be read as a bad augury for a coöperative future. A second and related question was whether the development of atomic weapons by Great Britain, Canada and the United States, and the announcement of this completed development at the end of the war, might not itself appear to cast a doubt upon our willingness to coöperate in the future with allies with whom we had not in this field been willing to coöperate during the war.

In any case, these doubts pointed rather strongly to the need for discussions between the heads of state and their immediate advisors, in an attempt to re-open the issue of far-reaching coöperation. The later relegation of problems of atomic energy to discussions within the United Nations, where matters of the highest policy could only be touched upon with difficulty and clumsily, would appear to have prejudiced the chances of any genuine meeting of minds.

In the field of atomic energy our own security demanded a quite new approach to international problems. The security of all peoples would be jeopardized by a failure to establish new systems of openness and coöperation between the nations; and many favorable circumstances made concrete coöperative action appear attractive and feasible. Thus atomic energy had a special rôle in international affairs. Yet it should be stressed again that no prospect of intimate collaboration in this field appeared likely of success unless coupled with a comparable coöperation in other fields. It should be stressed again that if atomic energy appeared

of some importance as an international issue, it was precisely because it was not entirely separable from other issues, precisely because what was done in that field might be prototypical of what could be done in others, and precisely because we appeared to have in this a certain freedom of manœuvre — which our technical developments appeared to have given us — to ask for a consideration on the highest possible plane of the means by which the nations of the world could learn so to alter their relations that future wars would no longer be likely.

IV

The views which have just been outlined no doubt reflect only roughly those current in the closing months of the war, among the people to whom familiarity or responsibility had made the nature of atomic energy apparent. That considerations such as these should have found expression in the policy of the people and the Government of the United States is itself somewhat surprising. One must bear in mind that the field of atomic energy was quite unfamiliar to the people of this country, that the whole spirit and temper of a development of this kind would require explaining and reexplaining. One must bear in mind that for reasons of security much that was relevant to an understanding of the problem could not be revealed and cannot be revealed today. One must bear in mind that with the end of the war there was a widespread nostalgia among all our people that the efforts and tensions of the war years be relaxed and that we return to a more familiar and less arduous life. That under these circumstances the United States should have developed, and in large part committed itself to, a policy of genuine internationalization of atomic energy, and that it should have fortified this policy with concrete, if sketchy, proposals as to how the internationalization was to be accomplished, and indeed that it should have taken the initiative in putting these views before the governments of the other Powers — this should not be too lightly dismissed as a remarkable achievement in the democratic formulation of public policy. Nevertheless, this has cost something.

Perhaps most of all what it has cost is that in our preoccupation with determining and clarifying our own policy, we have given far too little thought to attempting to influence that of the Soviet Union on the only plane where such an influence could be effective. We have allowed our own internal preoccupations to make us

content to put forward our views in the world forum of the United Nations, without pursuing early enough, on a high enough plane, or with a fixed enough resolution, the objective of making the heads of the Soviet state in part, at least, party to our effort. Our internal effort has cost delay, it has cost confusion, it has cost the injection of some irrelevant and some inconsistent elements in our policy with regard to atomic energy. Above all, it has cost a sort of schizophrenic separation of our dealings in this field from our dealings in all others. In fact, in order to keep pace with political developments all over the world, we have found ourselves negating in many concrete political contexts the possibility of that confidence and that coöperation which we were asking for in the field of atomic energy. It is surely idle to speculate, as it may well be meaningless to ask, whether, if this country had had its own thoughts in better order in June 1945, and had been prepared to act upon them, its policies would have met with greater success. Only an historian to whom the intimacies of Soviet thinking and Soviet decision are freely available would be able to begin to answer such a question. But the evidence, as the actual course of events has unfolded it, necessarily gives little support to the view that by prompter, clearer and more magnanimous action we might have achieved our purposes.

The history of the development of United States atomic energy policy from the first pronouncements of President Truman and Secretary Stimson on August 6, 1945, to the most recent detailed working papers of the United States representative on the United Nations Atomic Energy Commission, is of public record, and has in large part been summarized by the State Department's report "International Control of Atomic Energy."¹ Two aspects of this development need to be specially mentioned. One has to do with what may be called the aim of United States policy — the sketch of our picture of the world as we would like to see it in so far as atomic energy was concerned. Here, the principles of internationalization, openness, candor and the complete absence of secrecy, and the emphasis on coöperative, constructive development, the absence of international rivalry, the absence of legal right for national governments to intervene — these are the pillars on which our policy was built. It is quite clear that in this field we would like to see patterns established which, if they were more

¹"International Control of Atomic Energy: Growth of a Policy." Washington: Department of State Publication 2702, 1947.

generally extended, would constitute some of the most vital elements of a new international law: patterns not unrelated to the ideals which more generally and eloquently are expressed by the advocates of world government. It has naturally taken some time for it to be clear that more modest attempts at control were likely to aggravate rather than alleviate the international rivalries and suspicions which it is our purpose to abolish.

This solution which the United States has proposed and advocated is a radical solution, and clearly calls for a spirit of mutual confidence and trust in order to give it any elements of substance. Only in the field of sanctions — of the enforcement of undertakings with regard to atomic energy — has the policy of the United States necessarily been somewhat conservative. Here in an effort to fit this problem of enforcement into the preëxisting structure of the United Nations it has had to rely on the prospects of collective security to protect complying states against the deliberate efforts of another state to evade controls, and to arm atomically.

The second aspect of our policy which needs to be mentioned is that while these proposals were being developed, and their soundness explored and understood, the very bases for international coöperation between the United States and the Soviet Union were being eradicated by a revelation of their deep conflicts of interest, the deep and apparently mutual repugnance of their ways of life, and the apparent conviction on the part of the Soviet Union of the inevitability of conflict — and not in ideas alone, but in force. For these reasons, the United States has coupled its far-reaching proposals for the future of atomic energy with rather guarded reference to the safeguards required, lest in our transition to the happy state of international control we find ourselves at a marked relative disadvantage.

Many factors have contributed to this background of caution. There appears to be little doubt that at the present time our unique possession of the facilities and weapons of atomic energy constitute military advantages which we only reluctantly would lay down. There appears to be little doubt that we yearn for the notion of a trusteeship, more or less as it was formulated by President Truman in his Navy Day address of late 1945: we would desire, that is, a situation in which our pacific intent was recognized and in which the nations of the world would gladly see us the sole possessors of atomic weapons. As a corollary, we are reluctant to see any of the knowledge on which our present mastery of atomic

energy rests, revealed to potential enemies. Natural and inevitable as these desires are, they nevertheless stand in bleak contradiction to our central proposals for the renunciation of sovereignty, secrecy and rivalry in the field of atomic energy. Here again, it is no doubt idle to ask how this country would have responded had the Soviet Union approached the problem of atomic energy control in a true spirit of coöperation. Such a situation presupposes those profound changes in all of Soviet policy, which in their reactions upon us would have altered the nature of our political purposes, and opened new avenues for establishing international control, unfettered by the conditions which in the present state of the world we no doubt shall insist upon. Nor should it be forgotten that were there more reality to the plans for the internationalization of atomic energy, we ourselves, and the governments of other countries as well, would have found many difficulties in reconciling particular national security, custom and advantage with an over-all international plan for insuring the security of the world's peoples. That these problems have not arisen in any serious form reflects the lack of reality of all discussions to date.

Yet despite these limitations the work of the United Nations Atomic Energy Commission has established one point: through many months of discussion, under circumstances of often dispiriting frustration, and by delegates not initially committed to it, the basic idea of security through international coöperative development has proven its extraordinary and profound vitality.

v

The view sketched above of the international aspects of the problems of atomic energy is thus a history of high, if not provably unreasonable hope, and of failure. Questions will naturally arise as to whether limited but nevertheless worthy objectives cannot be achieved in this field. Thus, there is the question of whether agreements to outlaw atomic weapons more like the conventional agreements, supplemented by a more modest apparatus for inspection, may not give us some degree of security. Possibly when the lines of political hostility were not as sharply drawn as they are now between the Soviet Union and the United States, we might have tried to find an affirmative answer to this question. Were we not dealing with a rival whose normal practices, even in matters having nothing to do with atomic energy, involve secrecy

and police control which is the very opposite of the openness that we have advocated — and under suitable assurances offered to adopt — we might believe that less radical steps of internationalization could be adequate. The history of past efforts to outlaw weapons, to reduce armaments or to maintain peace by such methods gives little encouragement for hopefulness regarding these approaches.

Nor does it seem reasonable to hope, with the world as it now is, and with our policies in fields other than atomic energy as clearly predicated as they now are on conflict (which is not the same as war) with the Soviet Union, that intermediate solutions involving, perhaps, a formal renunciation of atomic armament, and some concession with regard to access to atomic facilities on the part of international inspectors, will appeal to us as useful. They will hardly do so either in the achievement of present security or the later realization of coöperative relations. Indeed, it has come to be the official position of the Government of the United States that palliative solutions along these lines would almost certainly give rise to intensified suspicions and intensified rivalries, whereas they manifestly would lose for us whatever national advantages — and they cannot *a priori* be dismissed as inconsiderable — our prior development and extensive familiarity with atomic energy now give us.

Clearly we may not lightly dismiss consideration of whether there are other approaches to the problem of the international control of atomic energy which have a better chance of contributing to our security. In fact, recent literature is replete with suggestions along these lines. No one aware of the gravity of the situation can fail to advocate what appears to be a hopeful avenue of approach; and no one has a right to dismiss these proposals without the most careful consideration.

It is my own view that none of these proposals has any elements of hopefulness in the short term. In fact, it appears most doubtful if there are now any courses open to the United States which can give to our people the sort of security they have known in the past. The argument that such a course *must* exist seems to be specious; and in the last analysis most current proposals rest on this argument.

This does not mean that on a lower plane, and with much more limited objectives, problems of policy with regard to atomic energy will not arise, even in the international field. Clearly, ar-

rangements that could be established between the Government of the United States and other governments, for the purpose of profitably exploiting atomic energy or of strengthening our relative position in this field, have some sort of bearing on security, and have an important, if not transparent, bearing on the probabilities for the maintenance of peace. But such arrangements, difficult though they may be to determine, and significant though they may be for our future welfare, cannot pretend, and do not pretend, to offer us real security, nor are they direct steps toward the perfection of those coöperative arrangements to which we rightly look as the best insurance of peace. They belong in the same class, in our present situation, as the proper, imaginative and wise conduct of our domestic atomic-energy program. They are part of the necessary conditions for the long-range maintenance of peace; but no one would for a moment suppose them to be sufficient.

Thus, if we try to examine what part atomic energy may play in international relations in the near future, we can hardly believe that it alone can reverse the trend to rivalry and conflict which exists in the present-day world. My own view is that only a profound change in the whole orientation of Soviet policy, and a corresponding reorientation of our own, even in matters far from atomic energy, would give substance to the initial high hopes. The aim of those who would work for the establishment of peace, and who would wish to see atomic energy play whatever useful part it can in bringing this to pass, must be to maintain what was sound in the early hopes, and by all means in their power to look to their eventual realization.

It is necessarily denied to us in these days to see at what time, to what immediate ends, in what context, and in what manner of world, we may return again to the great issues touched on by the international control of atomic energy. Yet even in the history of recent failure, we may recognize elements that bear more generally on the health of our civilization. We may discern the essential harmony, in a world where science has extended and deepened our understanding of the common sources of power for evil and power for good, of restraining the one and of fostering the other. This is seed we take with us, travelling to a land we cannot see, to plant in new soil.